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Soybean Planting Date and Growth and Development Study

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Abstract
Soybean planted either the last week of April or the first week of May typically produces yields greater than later planted soybean. This project will determine if initiation and duration of particular growth stages, along with main stem node accumulation explain why early planted soybean (late April/early May) yield greater than late planted soybean (mid May). Six planting dates with a one week interval were planted at seven Iowa State University (ISU) research stations and growth stages of the plants from the different planting dates were determined twice a week.

Disciplines
Agricultural Science | Agriculture

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Introduction

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Materials and Methods

The experiment was a randomized complete block design with three replications. Main plots were six planting dates (Apr 17, Apr 24, May 1, May 9, May 16, and May 22). Plot size was 5 ft × 50 ft, with 25 ft used for biomass sampling and developmental notes and 25 ft used for harvest. The soybean variety was K283RR/SCN. Seed was treated with an insecticide-fungicide seed treatment, CruiserMaxx. Each plot was planted in four rows at 30-in. row spacing at a rate of 160,000 seeds/acre and a seeding depth of 1.5 in. Four plants were evaluated to determine growth stage two times a week for 20 weeks until plants reached harvest maturity. The plots were sprayed May 19 and June 21 with Roundup WeatherMAX to control weeds. They were also sprayed August 1 with Mustang Max to control soybean aphids. Plots were harvested with an Almaco small-plot combine on October 3. Grain yields were adjusted to 13% moisture. Reported yields and other harvest measurements are shown in Table 1. Dates at which plants reached a particular growth stage and the maximum number of main stem nodes are shown in Table 2.

Results and Discussion

Yields at the six planting dates were very similar as the April 18 planting produced 91.5 bushels/acre and May 22 planting produced 88.1 bushels/acre, a non-significant loss of 3.4 bushels/acre. Lowest yields were attained at the May 9 planting dates although this is probably due to the higher plant populations at harvest. Plants were shorter when planted on April 17 but greater plant height for later planting dates did not contribute to greater plant lodging. Soybean planted on April 17 and April 24 produced one more main stem node compared with all other planting dates. Time between planting and emergence was 12 days for the April 17 planting date but dropped to less than 10 days for planting dates after May 1. Delayed emergence with April 17 and 24 planting did not influence plant establishment as final stands were greater than 100,000 plants/acre. Plants began to flower on June 10 for the April 17 planting date but were delayed until July 1 for the May 22 planting date. Time between the R1 and R5 growth stages (seed number determination period) was 11 days longer for the April 17 planting date compared with the May 22 planting date. Plants reached harvest maturity 3 to 5 days earlier for planting dates that occurred prior to May 9. Studies will be conducted again in 2009.

Acknowledgements

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Table 1. Effect of planting date on soybean plant density, height, lodging, moisture, and yield.

Planting date	Plant density × 1000	Height (in.)	Lodging 1-5†	Moisture (%)	Yield (bu/acre)
April 17	115.9	36.3	1	14.3	91.5
April 24	110.6	37.3	1	14.2	89.8
May 1	145.2	39.7	1	12.2	89.6
May 9	206.2	38.7	1	14.1	85.1
May 16	128.3	38.3	1	14.3	87.6
May 22	145.2	40.3	1	13.9	88.1
LSD (0.10)	NS‡	1.6	NS	NS	NS

†Lodging score: the range extends from 1 = erect to 5 = flat.
‡NS, not significant at $P \leq 0.10$.

Table 2. Effect of planting date on day of emergence, timing of reproductive stage, and maximum main stem node accrual.

Planting date	Emergence	Reproductive stage								Maximum main stem nodes
		1	2	3	4	5	6	7	8	
April 17	Apr 29	Jun 10	Jul 1	Jul 8	Jul 18	Jul 29	Aug 12	Sep 2	Sep 12	20.5
April 24	May 7	Jun 10	Jul 1	Jul 15	Jul 22	Aug 1	Aug 15	Sep 9	Sep 16	20.2
May 1	May 9	Jun 20	Jul 1	Jul 18	Jul 25	Aug 1	Aug 15	Sep 9	Sep 16	18.8
May 9	May 20	Jun 20	Jul 3	Jul 18	Jul 29	Aug 5	Aug 19	Sep 16	Sep 23	17.8
May 16	May 25	Jul 1	Jul 8	Jul 25	Aug 1	Aug 8	Aug 19	Sep 19	Sep 23	19.3
May 22	Jun 1	Jul 1	Jul 11	Jul 29	Aug 1	Aug 8	Aug 19	Sep 19	Sep 23	19.2